Research Proposal of the Thesis Entitled

An Innovative Framework to start Operations and Sustainable supply chain after major disruptions

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by

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An Innovative Framework to start Operations and Sustainable supply chain after major disruptions.

Abstract

The frequencies & severity of supply chain disruptions such as Pandemic situation, War, Natural calamities, Riots pose significant challenges to global operations. These kinds of disruptions have caused in the shutting down of Operations at Original Equipment Manufacturers (OEM). It also disrupted the entire supply chain of almost all industries in India and therefore negatively affected production of auto spare parts in micro, small and medium-sized industries. In addition, to start the operations in industries was a big challenge because of many factors. Traditional recovery strategies, plans or actions often lack a comprehensive approach that integrates both Operational efficiency and Sustainable supply chain. This research proposes an innovative framework designed to restart operations and ensure a sustainable supply chain after major disruptions.

Based on the literature review, this research study will help to develop an effective Framework to start Operations and sustainable supply chain for automotive industries which will help in future if this kind of major disruptions arise. This study is helpful for suppliers, firms, and other stakeholders to focus on the identified factors and recommendations for healthful future. This study provides a roadmap for businesses to uplift their supply chain resilience and Operational efficiency.

Keywords:

(OEM) Original equipment manufacturers, Sustainable Supply Chain, Operational efficiency

Introduction

Sustainable Supply Chain – A Sustainable Supply Chain is a unified, integrated & extensive approach for managing the flow of goods, Services, Information & finances from the 1st stage of procurement of raw materials in the delivery of the final product to the end customer with a strong focus on minimizing environment impact, ensuring social responsibility and growing economic efficiency throughout the entire supply chain

In today's growing, globalized economy supply chains are the backbone of industries, facilitating the flow of goods and services from producers to consumers.

A Sustainable supply chain is an essential factor of the modern business models, which also integrate environmental, social and economic considerations into supply chain management.

By ensuring sustainable supply chain organizations can mitigate the risks, comply with all the regulations, and drive Innovations, Competitiveness, and contribute positively back to the society with higher purpose.

Operations – Operations refer to the processes and set of activities in the production and delivery of Goods & Services. This includes everything from the procurement of raw materials, manufacturing and assembly to on-time deliveries, to logistics, distributions and customer services. Operation Excellence or Effective operations ensures that above mentioned process runs efficiently, cost-effectively and at high quality levels.

Efficiency, Quality, Flexibility, Cost Management, Customer satisfaction are the important factors which can be achieved only through Operations excellence

Some of the strategies industries are using for effective Operations Management are Lean Manufacturing, Total Quality Management, Six sigma, Automation and Technology, Supply chain collaboration.

Effective operations management is the basis to the success of any organization. It ensures that all production, delivery of goods, services.

Research Objectives:

Main research objectives are as follows:

1. To define an innovative framework that helps to integrates Operational recovery and sustainable supply chain for long-term.
2. To identify and suggest best practices for sustainable supply chain management after major disruptions during the recovery process
3. To propose framework through detailed data analysis across various industries
4. To bridge the gap between theoretical supply chain resilience by offering practical guidelines and an innovative framework for the organizations. By addressing operational recovery

Research Questions

The below research questions aim to gather data to define an innovative framework for restarting operations and ensuring a sustainable supply chain after major disruptions.

Disruptions Impact

1. Has your organizational supply chain experienced a major disruption in last 5 Years? (Yes/No)
2. If yes, what type (nature) of disruptions? (Multiple choice)
3. How severely did the disruptions impact your operations? Financial impact (Scale base)

Strategies for recovery

4. What strategies did your organization (company) adopt to recover from the disruptions? (Checkbox)
5. How effective are these strategies in restarting operations? (Scale)

Sustainable supply chain practices

6. Is your organization focusing on sustainable practices in your supply chain management? (Yes/No)
7. If yes, what are the sustainable practices that are adopted? (Checkbox)
8. How important the sustainable practices in your supply chain recovery process? (Likert scale)

Innovative Framework

9. Are your organization aware of any Innovative Framework to start Operations and Sustainable supply chain after major disruptions? (Yes/No)
10. What are the factors that would influence your decision to adopt the new innovative framework? (Checkbox)

Review of Literature

Sharma Manu (2020) research focuses on the immediate impacts & issues of the Covid 19 on Supply chains and strategies for Resilience in the face of major disruptions.

He has provided valuable insights into the critical situation exposed by the pandemic. He proposed strategies for enhancing Operations & supply chain resilience through technology, flexibility and sustained foundation. He has studied some disruptions characteristics such as Global scale and Demand and Supply shocks. Also, he has mentioned key effects because of above disruptions those are Operational Delays, Inventory Management challenges, financial strain. His main findings are Supply chain vulnerabilities such as Single-source, lack of diversification, inadequate risk management practices. Emphasized the importance of flexibility and adaptability in operations and in supply chain to respond the unexpected disruptions. He has highlighted the role of emerging technology such IoT, Blockchain and AI to improve visibility, traceability and decision-making [1]

Bhakar Vikrant (2018) in his research on "Development of a Sustainability Assessment Framework for Manufacturing Industry" has primarily addresses that Supply chain Resilience: Strategies to withstand and quickly recover from major disruptions. Sustainable Practices: Integration of environmental along with social consideration into supply chain management. Operational efficiency: Methods to improve efficiency through technology and process optimization. Operational efficiency depending upon Lean Manufacturing: Focusing on eliminating wastages, continuous product & process improvements, just-in-time production to enhance efficiency. Techniques such as Value Stream Mapping, 5'S, and Kanban all these processes and reduce lead times. Total Quality Management (TQM) which is mainly focuses on customer satisfaction and involvement of all employees to enhance overall product quality Technology integration using robotics and automation to improve production speed and accuracy. By data analytics to optimize operations in supply chain, demand forecast along with informed decisions. He suggested sustainability, combing resilience & efficiency into one framework that will enhance overall supply chain performance to next level. His study offers an inclusive foundation for overall supply chain resilience and Operational efficiency. By proper integration these all elements into an Innovative framework, most of the business can better prepare for and to respond to major disruptions along with long-term sustainability with Operational excellence. In the future need to validate these integrated approaches, need to ensure practical application and effectiveness in real-world situation [2]

Kaur Amrinder (2017) from his study we get to know the integration of all sustainable practices and overall operational efficiency. He mentioned Sustainable Supply Chain Management (SSCM): Strategies for integration social, environmental and economic sustainability into supply chains. Operational efficiency methods to optimize supply chain processes and improve performance. Sustainable Procurement approaches to sourcing emphasize sustainability and ethical practices.

He developed a Performance Measurement framework for assessing the performance of sustainable supply chains.

Sustainable Supply Chain Management (SSCM) involves managing material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, economic & social environment. Developing and utilizing KPIs to measure and improve supply chain performance. He studied on barriers of sustainable practices such as Cost constraints, Lack of Awareness, Resistance to Change and the enablers such as Regulatory support, Stakeholder Pressure, Technological Advancements: Innovations in technology that make sustainable practices more feasible and cost-effective.

Kaur Amrinder's study provides valuable insights into the integration of sustainability and operational efficiency in supply chain management. He identified barriers and enablers and highlighted the importance of performance measurement. Future research should build on these foundations to develop integrated frameworks and provide empirical validation of sustained practices in diversified supply chain

He has also given future directions as research Gaps are Longitudinal Studies: Need for long-term studies to assess the sustained impact of SSCM practices

Integrated Frameworks

He also studied Green Procurement: Sourcing materials and products that have minimal environmental impact. Implementing practices that reduce resource consumption and waste generation, such as energy-efficient and recycling production processes

Social Responsibility: Ethical Souring-Ensuring fair labor practices, Safe working conditions and respect for human rights throughout the supply chain. Supporting local communities and taking social responsibility.

Cost-Benefits: Balancing the cost associated with sustainable practices with economic benefits.[3]

Sonu Rajak & K. Mathiyazhagan (2021) research primarily addresses on 3 topics

- Sustainable Supply Chain Management (SSCM): Strategies mainly for incorporating sustainability into supply chain practices.
- Supply chain resilience: Building resilient supply chains that can withstand and recover from disruptions.
- Integration of Sustainability and Resilience: Developing frameworks that combine sustainability and resilience to create robust supply chains.

They have following findings Resilience Frameworks, Sustainability Practices, Integration Strategies. Their work given a comprehensive foundation for understanding and enhancing supply chain sustainability and resilience. Integrating elements into a cohesive framework, their research offers practical strategies for business to prepare for and response to disruptions, while also achieving long-term sustainability and Operation excellence.

Further research may be built by using these foundation work which will help to develop, validate different approaches by ensuring practical applications [4]

Erfan Babaee Tirkolaee (2020) studied "Designing a sustainable closed-loop supply chain network" (2020) The short explanation is he studied on 1. Waste management 2. Optimization in supply chains. He has given insights for integrating sustainability for supply chain operations and developed different models for optimizing Waste management processes. His research address Three models 1. Optimization Models 2. Integration of Environmental 3. SSCM

From his models we can optimize waste collection, transportation, disposal in supply chain. Identified strategies to minimize the environmental impact of supply chain operations through efficient waste management.

He provides significant contributions to the field of sustainable supply chain management, in waste management. By developing and applying optimization models, he offers solutions for integrating sustainability into supply chain operations, thereby reducing environmental impact and improving resource efficiency.

In future we can explore and refine all these models with ensuring their applications in various industry sector and in overall supply chain [5]

Muhammad Umar Farooq (2021) studied "Supply Chain Operations Management in Pandemics: A State-of-the-Art Review Inspired by COVID-19" (2021). His research was in the field of sustainable supply chain management and risk management. His research supports into integration of supply chain by managing all kinds of risks, especially in the challenges like Covid pandemic situation.

His research mainly focuses on three parameters 1. Risk Management 2. SSCM 3. Impact of

Covid-19. He analyzed in detail effects of the COVID-19 pandemic situation on different supply chains and how companies can build their long-term strategies.
To address complex global challenges, he combines risk management parameters.
By proposing integrated frameworks that combine sustainability with risk management, Farooq provides a clear roadmap for businesses to build sustainable, efficient supply chains with resilience. [6]

Amine Belhadi (2021) studied "Manufacturing and Service supply chain Resilience"
He has mentioned the important fields of supply chain resilience and sustainability in long-terms. His research mainly focuses on how all the organizations can enhance their resilience in supply chain. While doing this all organization need to ensure that sustainable practices are being implemented during disruption like the pandemic.
His research primarily addresses on

1. Resilience in Supply chain: Strategies should be available for building resilient supply chain that can survive and recover from major disruptions.
2. Sustainable Supply Chain Management (SSCM): Integrate sustainability into supply chain practices to achieve environmental responsibility & Operational efficiency. [7]

Aalok Kumar (2020) studies & provides all main insights into sustainable supply chain management in the context of major disruption like Covid-19.
His research underlines the importance to integrate resilience into supply chain, while maintaining business financials and environment effectively. His research primarily focuses on Impact of Major Disruptions – He analyzed global issues like Pandemic, affect supply chain dynamics and steps for resilience. Methods for integration of social, environmental sustainability [8]

Kris Timmermans (2020) Senior Managing Director who heads Accenture Strategy's operations, supply chain, and sustainability practices studied and provided valuable insights into the need for supply chain flexibility and sustainability in the face of global disruptions. By doing advocation for integrated strategies that combine these two elements, He offers a roadmap for businesses to build supply chains. Both resilient to disruptions and aligned with long-term sustainability goals.
He works highlighting the critical need for businesses to enhance flexibility and sustainability in supply chain, particularly in the period of major disruptions such as the COVID-19 pandemic. From his research we can understand framework by which companies can maintain operational efficiency with their sustainability targets during and after crises.

Future Directions

Research Opportunities

The long-term impacts of integrating flexibility and sustainability in supply chain management on many aspects.

From his study we can explore Sector-Specific analysis for the effectiveness of the strategies across different regions, sectors and industries.

Policy and Collaboration

Policy Recommendations: His study will help for the development of policies that support the integration of flexibility with sustainability in supply chains, backed by government incentives and industry standards

Collaborative approach in Efforts: His study helps to encouraged greater collaboration between governments, businesses and academic institutions to drive the implementation of flexible and sustainable supply chain practices in all industries [9]

Misra Vikas (2011) his research focuses on the foundational understanding of how businesses can integrate sustainability into their supply chains with maintaining operational efficiency. Both the things i.e. sustainability and efficiency can go together he mentioned. By ensuring bottom line his insights can enhance the sustainable supply chain practices in a way that benefits the environment also. We should continue to explore these themes, ensuring their relevance and applicability across various industries and regions.

Main Findings

He mentioned that sustainability should be a core component of supply chain strategy

Efficiency with Sustainability: He mentioned that operational efficiency and sustainability are not mutually exclusive and must be achieved simultaneously through detailed planning, execution with innovation.

He highlighted the role of supply chains in reducing environmental impact with proper example, particularly through the adoption of Green technologies and practices

Research Opportunities

He suggested for more longitudinal studies to assess the long-term impact of sustainable practices with operational efficiency and overall business performance.

The contributions of Vikas Misra (2011) in the fields of supply chain sustainability and operational efficiency.

Misra's work focuses mainly on the integration of sustainable practices into supply chain management, emphasizing the need with balancing environmental responsibility with operational efficiency.

The Research primarily revolves

(SSCM) Sustainable Supply Chain Management: Exploring how businesses can incorporate sustainability into their supply chains while maintaining efficiency.

Operational Efficiency: His study helped in investigating the ways by which sustainable practices can be aligned with focusing operational objectives to enhance overall efficiency.

His study emphasizing mainly on the importance of minimizing the environmental impact of supply chains through strategic planning and innovation

Reducing Environmental Impact

He highlighted the importance of reducing the carbon footprint of supply chains

1. Energy-efficient logistics, 2. Reduced in transportation distances, and sustainable sourcing. [10]

Parulekar Ajay Dinkar (2016) studied mainly the field of sustainable supply chain management (SSCM). Parulekar's work focuses on the integration of sustainability principles into supply chain operations, emphasizing the need for a balance between environmental stewardship and economic performance.

Research addresses:

SSCM: He mentioned that the strategies for integrating sustainability into supply chain operations without compromising on economic goals.

Triple Bottom Line Approach: 1. Balancing economic, 2. Environmental 3.Social aspects in supply chain management.

It can be possible for reducing the environmental footprint of supply chains through innovative practices and technologies

Main Findings

This includes cost management, profitability, and competitive advantage.

Environmental Sustainability: Highlighted the importance of reducing the environmental impact of supply chains, such as minimizing waste, reducing carbon emissions, and conserving resources

Social Responsibility: Stressed the significance of social responsibility, including fair labor practices, community engagement, and ensuring the welfare of workers within the supply chain

Sustainability Integration: Emphasized that sustainability should be a core component of supply chain strategy, integrated from the outset rather than added later.

Innovative Practices: Need to Identify innovative practices and technologies that can help reduce the environmental impact of supply chains while maintaining operational efficiency

Economic Sustainability: He emphasized the need for supply chains to remain economically viable while pursuing sustainability goals. [11]

Research Gap:

Having critically reviewed theses, abstracts reviewed it was found that a lot of work has been done on Developing Framework to start operations and Sustainable supply chain post pandemic situation.

Though a lot of studies and research have been conducted in this area & most of the articles are from the years 2020 & 2021, but most of them have been conducted under the defined circumstances.

The following are prominent gaps that need some attention as future scope.

1. The studies are done on theoretical bases, whereas now a days, we can take interviews, surveys, direct interactions, visit to industries & can take exact & accurate data which is realistic at the time of Operations resumption by various industries

2. The start-up activities have been done differently by different industries. Scope is available to find out some best practices which have the top 1 to 5 parameters for business growth.

3. Almost all the industries consider Covid 19 is the only pandemic & this kind of situation will really come, but we cannot say like this. In future may be this kind of pandemic situations will arise, hence it is essential that this kind of an effective Framework are required to start the operations & sustain supply chain post pandemic

4. The frameworks which are mentioned in Literature review, most of these are not tested fully. There is an opportunity to study the impact of all these frameworks on business startup, continuity, and growth.

5. If someone can go to greater depths and try to develop separate framework more precisely such as automotive industries of auto spare parts in micro, small and medium-sized industries, it will tremendously help the industries and to the Society as larger picture. Moreover, it will help the organizations decide on strategies post such pandemic situations

Research Methodology

Research vision: An Effective Framework to start Operations and Sustainable supply chain after major disruptions (Example are like post pandemic situation, War, Natural calamities, Riots)

Research objective: To encourage the suppliers as the lockdowns have ended and businesses plan to revive operations, it will effectively be a fortnight of preparation to jump start business operations. I want to develop an effective Framework to start Operations and sustainable supply chain for automotive industries which will help in future if this kind of pandemic situation arise

Priority area of research: Study of supply chain cycles in the suppliers across pan India supplying parts to the OEM manufacturers

Research scope: Establish correlation to start operations at supplier end after the pandemic situation

Research Method: Select an industry mainly automobile & their suppliers and find out what Method, Strategies & Process they have used after pandemic situation to start their operations and their supply chain.

• Group the Common & Top things in the scale of 1 of 10

• Find out which Top Method, Strategies & Process suppliers are using for restarting their operations for sustainable supply chain

• Understand the extent to which these Method, Strategies & Process are used throughout the industries and to what level of execution. Rate them in the scale of 1 to 10

• Find out what is an effective framework is more suitable for most of industries.

• For this a scale needs to be made that will define the maturity of organization in using quality tools. PPM is a linear scale so is simple scale from 0 to 1 million.

Sampling method: Survey method

Get information from the manufacturers' association and arrange the names in the ascending order of the names. Divide the suppliers in two clusters; one based on the items manufactured (casting, forging, machining, plastic, sheet metal etc.) and another cluster based on the turnover.

Use cluster sampling method with random sampling so that 10% of the total population or 100 suppliers whichever is higher are selected.

Sample size – 400 No's

The most used formula for sample size calculation in survey-based research is the following

$$n = [Z^2\ p\ (1 - p)]/\ e^2$$

n = Required sample size

Z = z score (the no of std deviations a data point is from the mean)

P = Estimated proportion of an attributed present with population

e = margin of error (level of precision desired)

Hypotheses –

Hypotheses provide clarity about the outcomes that the research aims to test.

Impact of Framework: H1 – Time: Innovative framework significantly reduces the recovery time of supply chain operations & overall operation time compared to traditional recovery methods

Cost effectiveness: H1 – Cost: Significant reduction in recovery costs after major disruptions in overall supply chain & Operations compared to traditional way of recovery

Sustainable supply chain: H2 – Resilience: Use of Innovative framework will provide a more stable & resilient supply chain with less disruptions in the short term & long term compared to traditional methods.

Stakeholders' satisfaction: H3 – Satisfaction Index: Use of Innovative framework will increase satisfaction Index of stake holders (Including customers, suppliers, Leadership and employees) during recovery phase after major disruption

Adaption of Technology & Integration: H4 – Advance technology: Use of Innovative framework will help to adopt new technologies such as IoT, Blockchain, AI, ML to enhance the overall efficiency & effectiveness of supply chain recovery process

Key performance indicators (KPI): H5 – KPI: Use of Innovative framework will company to perform in better terms of key performance indicators such as Inventory management, Lead time management, Service levels, Sale orders lead time, on time deliveries post-disruptions compared to companies that do not.

This hypothesis study will help & guide data collection and analysis, to frame a structure and to draw meaningful conclusions, results about the effectiveness of proposed framework.

Research Outputs: Visible

Results and conclusions which would be obtained after completing the research will be in the form of a toolkit or guide for organizations to implement innovative framework, step-by-step instructions, best practices, techniques and templates. This can be made available online through our university or a dedicated website. Slide decks and recordings of my presentation at industry conference.

Online seminars where I can present my research findings and discuss the framework with a bigger audience. Webinars can be shared on many platforms such as YouTube, Instagram, websites

Writing articles or blogs for various industry magazines and platforms like LinkedIn to share insights from my research.

Policy recommendations – Detailed documentation that outlines the policy implications of my research and provide recommendations for the industries to promote Sustainable supply chain practices.

These research outputs can be shared with industry associations.

By leveraging various platforms, channels and formats I can ensure that my research on Sustainable supply chain and Operational efficiency reaches a wide audience and has a long-lasting impact on both academic and industry.

Tentative Chapter Plan

Chapter 1: Introduction

- Supply chain disruptions – Background
- Resilience and sustainability in supply chains

Chapter 2: Literature Review

- Existing literature on supply chain disruptions
- Gaps in the existing literature that my research aims to address

Chapter 3: Methodology

- Data collection methods (Surveys, Interviews, Case studies)
- Analytical techniques (Statistical analysis, Sentiment analysis, Affinity diagram, Value stream mapping, Inventory Management, Sale order process analysis)

Chapter 4: Data analysis & Hypothesis

- Evaluation of the impact of disruptions on overall Operations, Inventory Management
- Insights from Industry Leaders, Experts & Shop floor employee's interviews

Chapter 5: The Innovative Framework

- Design of Framework - Concept, Key components & Principles of Framework
- Framework addresses both immediate operational recovery and sustainable supply chain

Chapter 6: Feedback from stakeholders

- Framework discussion with stakeholders & validation
- Feedback from stakeholders on findings

Chapter 7: Limitations

- Limitations of the research and potential areas for future work

Chapter 8: Conclusions

- Summary of the research finding

Bibliography

Annexure

Future plans

Year 1: Course Work, Overview of Thesis with introduction

Year 2: Literature review, Data Gathering

Year 3: Data Compilation, Detail Presentation with Analysis, Development of model

Year 4: Finding write up and Final Thesis

Year → / Activity ↓	1st		2nd		3rd		4th	
Course Work								
Introduction and Overview of Thesis								
Literature Review								
Data Gathering								
Data Compilation, Presentation and Analysis								
Model Development								
Writing the findings and Thesis Finalisation								

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Signature of Student **Signature of Supervisor / Co-Supervisor(s)**